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WRISTWATCH CASE

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a wristwatch case.

Description of the Related Art

In a conventional wristwatch case, although the construction was such that the case could be divided into an outer case and an inner case, the inner case could not be moved in a vertical direction relative to the outer case.

Also, it was impossible to rotate only the inner case.

In the related-art wristwatch, when the wristwatch is worn on the wrist, the wristwatch is positioned in a direction so that it is easy to see by moving the wrist. However, when the user's wrist movement is restricted, the timepiece is at an angle at which it is not easy to see. Also, if, in such a state, the user's wrist is unnaturally moved to see the timepiece, there is a possibility of inducing an improper operation or drive.

SUMMARY OF THE INVENTION

In accordance with the present invention, it is an object to provide a wristwatch case which solves the foregoing problem and can provide an inner case that may be rotated desired angle regardless of the position of the user's wrist and positively lock the rotation of the inner case in that position.

The inner case mounting a timepiece movement is structurally movable generally vertical with respect to a plane of a wristwatch case, being divided into a plurality of stop points in a vertical operating range, i.e., a stop point at which rotation of the inner case is positively fixed and a stop point for allowing rotation of the inner case. This makes it possible to change the inner case to a desired angle and positively lock the rotation of the inner case in that position.

According to the present invention, at the stop point for positively fixing the rotation of the inner case, a gear-formed convex-concave formed in the outer case engages a rotation-regulating portion of a concave-convex-formed gear of a rotation-regulating ring and positively regulates the rotation. At the stop point for allowing rotation, the engagement is released from the rotation-regulating portion of the rotation-regulating ring to enable the inner case to rotate.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred form of the present invention is illustrated in the accompanying drawings in which:

Fig. 1 is a main structure fragmentary section view of a preferred embodiment of the invention in which an inner case is at a lower stop point;

Fig. 2 is a main structure fragmentary sectional view in which the inner case is at an upper stop point;

Fig. 3 is a main structure fragmentary sectional view in which the inner case is at a lower stop point;

Fig. 4 is a sectional view of the inner case at the lower position taken along Line 4-4' of Fig. 3;

Fig. 5 is a main structure fragmentary sectional view in which the inner case is at an upper stop point;

Fig. 6 is a partial sectional view of the inner case at the upper position taken along line 6-6' of Fig. 5;

Fig. 7 is a plan view of a ring elastic part of the invention; and

Fig. 8 is a plan view as viewed in a glass direction of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the present invention will be explained with reference to the attached drawings.

The present invention is structured, as shown in Fig. 1, by an outer case 1 having a degree-contact step 11 and a positioning groove 12 for holding a positioning elastic member 5, the outer case 1 also having a gear-formed convex/concave portion 13. An inner case 2 has an outer case degree-contact surface 26 and is provided with a positioning protrusion 25. A rotation stop dowel 43 is engaged in a rotation stop hole 23 and a rotation regulating ring 4 having a rotation regulating portion 41 corresponding to the gear-formed concave-convex portion 13 is fixed in an opening defined within the inner case 2. Also, the

inner case 2 is mounted with a timepiece movement 9 therein (Fig. 8).

Fig. 1 shows the state in which an inner case receiving surface 14 (Fig. 2) is in contact with an outer case-receiving surface 21 of the inner case 2, which is referred to herein as a lower stop point. Due to the positioning elastic member 5 held by the positioning groove 12 of the outer case 1 and the positioning protrusion 25 of the inner case 2, the inner case 2 can stop at the lower stop point.

By engaging the rotation stop dowel 43 of the rotation-regulating ring 4 in one or a plurality of rotation stop holes 23 formed in the inner case 2, the rotation-regulating ring 4 will not rotate. At this time, engagement is made between the gear-formed concave-convex portion 13 of the outer case 1 and the rotation-regulating portion 41 of the rotation-regulating ring 4 fixed by the inner case 2, so that the inner case 2 securely stops and will not rotate.

One or more of the rotation regulating portions 41 of the rotation regulating ring 4 fixed in the inner case 2 may be provided.

The stop stability is further secured for the inner case 2 by contact between a chatter-preventing elastic member 6 fitted in a fixing groove 24 of the inner case 2 and an elastic contact surface 15 (Fig. 2) of the outer case 1. A band 8 is provided with the outer case 1 so it is able to attach a watch on the arm. A glass 3 and a back lid 7 are fixed on the inner case

1. The inner case 1 protects the timepiece movement 9 (Fig. 8) and maintains an hermetic seal.

Fig. 2 shows a state in which the inner case 2 is vertically moved by pulling upward from a finger-engaging portion 19 (as viewed from a portion at which the outer peripheral wall 16 as in Fig. 1 does not exist) to a finger-engaging slant surface 28 of the outer case 1, whereby the positioning elastic member 5 held by the positioning groove 12 of the outer case 1 deforms and slides over a positioning protrusion 25 of the inner case 2. Also, the inner case 2 may be vertically moved by finger-pressing a back-lid bottom surface 71 of the back lid 7.

At this time, the positioning elastic member 5 held by the positioning groove 12 of the outer case 1 interferes with a positioning protrusion upper slant surface 27 (Fig. 1) of the inner case 2 so that the inner case 2 is stopped at an upper stop point and the inner case 2 can be stably rotated at the upper stop point.

In the state, engagement is completely released between the gear-formed concave-convex portion 13 of the outer case 1 and the rotation-regulating portion 41 of the rotation-regulating ring 4 fixed on the inner case 2. The inner case 2 can rotate freely.

The rotation regulating ring 4 has a removal-preventing protrusion 42 such that, when the inner case 2 is moved to the upper stop position, the rotation regulating ring 4 fixed to the inner case 2 is not left together with the outer case 1 in the

lower stop point. By the interference between the removal preventing protrusion 42 of the rotation regulating ring 4 and a circumferential groove lower wall 22 of the inner case 2, the rotation regulating ring 4 is not left in the lower stop point but can be moved together with the inner case 2 to the upper stop point.

As illustrated in Fig. 6, at the upper stop point, meshing is made between the gear concave portion 17 (Fig. 4) of the gear-formed concave-convex portion 13 of the outer case 1 and a click elastic protrusion 45 provided in a click elastic portion 44 of the rotation regulating ring 4 fixed in the inner case 2.

If the inner case 2 is rotated, the click elastic protrusion 45 provided in the click elastic portion 44 of the rotation regulating ring 4 is moved in a radial direction by a rotation force and intermittently interferes with the gear-formed concave-convex portion 13 formed in the outer case 1, thereby giving a click feel to the inner case 2.

As illustrated in Fig. 7, the rotation regulating portion 41 of the rotation regulating ring 4 and the click elastic protrusion 45 are planarly alternately arranged.

Also, the rotation regulating portion 41 of the rotation regulating ring 4 and the click elastic protrusion 45 are arranged in an upper surface and a lower surface with respect to a planar direction.

One or more of the click elastic portions 44 of the rotation regulating ring 4 and the click elastic protrusions 45 are provided.

The outer case 1 has a degree-contact step 11 and the inner case 2 has an outer-case-degree-contact portion 26 such that, when the inner case 2 is moved in the upper direction, the inner case 2 is prevented from falling out of the outer case 1.

Fig. 3 shows the inner case 2 in the lower stop point, and Fig. 4 is a sectional view along line 4-4' of Fig. 3. The gear-formed concave-convex portion 13 having the gear concave portion 17 and the gear convex portion 18 engages the rotation-regulating portion 41 of the rotation regulating ring 4 on a plane, so the inner case 2 does not rotate.

Fig. 7 shows a plan view of the rotation regulating ring 4. Fig. 7 shows a state in which the rotation-regulating portion 41 and the click elastic protrusion 45 are alternately arranged along a plane.

Fig. 8 shows a plan view of a watch case as seen when viewing the watch glass. The finger-engaging protrusion 19 having an outer peripheral wall 16 is provided with the outer case 1 so as to easily operate it with fingers when the inner case 2 is moved toward a vertical direction. It is better that the finger-engaging portion 19 is provided at two or more position. The band 8 is provided with the outer case 1.

In accordance with the present invention, as described above, when the inner case 2 is positioned at the lower stop

position, the gear-formed concave-convex portion 13 engages the rotation regulating portion 41 of the rotation regulating ring 4 to inhibit the inner case 2 from rotating. When the inner case 2 is positioned at the upper stop position, the gear-formed concave-convex portion 13 and the rotation-regulating portion 41 of the rotation-regulating ring 4 are released from engagement to enable the inner case 2 to freely rotate. Thus, a wristwatch case structure can be realized that is different in rotation function of the inner case 2 by providing the stop positions.

This makes it possible to change the inner case to a desired angle at which it is easy to see regardless of the position of the user's wrist, and to lock the rotation of the inner case at that position.

As shown in Fig. 5 and Fig. 6, when the inner case 2 is moved to the upper stop position, slight interference is caused between the gear-formed concave-convex portion 13 and a click elastic protrusion 45 provided in the click elastic portion 44, enabling to provide a click feeling to free rotation of the inner case 2.